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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,849	07/18/2002	Paul Moeltgen	12707P04US	2233

26486 7590 04/16/2004  
PERKINS, SMITH & COHEN LLP  
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EXAMINER

ANDERSON, MATTHEW A

ART UNIT PAPER NUMBER

1765

DATE MAILED: 04/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Applicati n No.

10/088,849

Applicant(s)

MOELTGEN ET AL.

Examiner

Matthew A. Anderson

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2002.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 7/18/2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1- are rejected under 35 U.S.C. 103(a) as being unpatentable over Sternitzke (Review: Structural Ceramic Nan-composites, Structural Ceramic Composites-composites, P11: So955-2219(96)00222-1, pp. 1061-1082.) in view of Reed (Introduction to the Principles of Ceramic Processing, John Wiley and Sons, New York New York, pp. 463-464, 1988.).

Sternitzke discloses the methods of forming nano-composites including  $\text{Al}_2\text{O}_3/\text{SiC}$  systems. (abstract) Sol-gel processing is suggested in the abstract. Item 2 on page 1062 1068 details  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composites. In 2.1.3 sol-gel processing is suggested as a method making the  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composites. Boehmite (a.k.a.  $\gamma$ -

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alumina to those of ordinary skill in the art) is suggested in 2.1.3 as a starting material to make a gel to coat the SiC de-agglomerated particles. The pH is adjusted. This is dried and calcined. Then hot-pressed at 1600°C. Inert sintering is disclosed in Table 2

Sternitzke does not suggest adding sinter additives to the sol.

Reed discloses common method of processing ceramics such as Al<sub>2</sub>O<sub>3</sub>. On page 463, Reed suggests adding a small amount of a wetting liquid (i.e. a sinter additive) to alumina during sintering to improve density and lower the temperature required for sintering. Abrasive media was one suggested use. The additive also prevents abnormal grain growth.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the references of Sternitzke and Reed because Reed discloses a method of improving density and reducing the temperature of sintering for abrasive media and Sternitzke discloses a process of making a composite based on alumina. Motivation to combine would be the expectation that denser nano-composite would be obtained at a lower sintering temperature.

In respect to claims 1-2, 4-6, 9 it would have been obvious to one of ordinary skill in the art at the time of the present invention to produce a Al<sub>2</sub>O<sub>3</sub>/SiC nano-composite by the sol-gel method as per Sternitzke using a Boehmite precursor and fine SiC with sintering additives added and pH adjustment which is sintered under inert conditions because such a method would produce a Al<sub>2</sub>O<sub>3</sub>/SiC nano-composite with an improved density and at a reduced the sintering temperature.

In respect to claims 3, 12, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the mol. % of the SiC because although Sternitzke discloses vol% of SiC in the alumina matrix from 0% to 30% (see Fig. 5), vol% and mol.% are mathematically related as well known in the art.

In respect to claims 7 and 8, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the temperature of the drying, calcinations, and sintering because although Sternitzke does not specifically specify the temperatures, one of ordinary skill in the art would do so with only routine experimentation. Reed suggests that the sintering temperature can be lowered. Motivation for using a lower temperature would be cost savings for fuel and less wear on heating systems.

In respect to claims 10, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composite comminuted from sintered  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composite because Sternitzke suggests on page 1079 the use of such  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composites as an abrasive grit and basic skill in the art allows comminution of ceramics to fine powder.

In respect to claims 11, 13-19, it would have been obvious to one of ordinary skill in the art at the time of the present invention to conclude, without evidence to the contrary, that the  $\text{Al}_2\text{O}_3/\text{SiC}$  nano-composite of Sternitzke would have the claimed physical properties because one of ordinary skill would expect like materials to act in a like manner when formed by a like process.

In respect to claim 20, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use an abrasive powder with grinding belts or wheels since this is common to anyone of ordinary skill in the art.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (571) 272-1459. The examiner can normally be reached on M-Th, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAA  
March 16, 2004

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**



**PATENT DRAWING REVIEW**  
Under USPTO Standards 37 CFR 1.84 and 1.152

The drawings, filed on 07/18/2002 , are not compliance with the following Rules:

<p><b>1. DRAWINGS. 1.84(a).</b> <input type="checkbox"/> Color drawings are not acceptable until petition is granted. Fig(s). <input type="checkbox"/> Three sets of color drawings are required. Fig(s). <input type="checkbox"/> Pencil, non-black ink are not permitted. Fig(s).</p> <p><b>2. PHOTOGRAPHS. 1.84(b).</b> <input type="checkbox"/> Poor quality photos. Fig(s).</p> <p><b>3. TYPE OF PAPER. 1.84(e).</b> <input type="checkbox"/> Paper not flexible, strong, white, and durable. Fig(s). <input type="checkbox"/> Erasures, alterations, over writings, interlineations, folds, copy machine marks not accepted. Fig(s).</p> <p><b>4. SIZE OF PAPER. 1.84(f).</b> Acceptable paper sizes: 21.0cm x 29.7cm (A4 International Standard Size) 21.6cm x 27.9cm (US Letter size, 8.5" x 11") <input type="checkbox"/> All drawing sheets are not the same size. Sheet(s) <input type="checkbox"/> Paper size not acceptable. Fig(s).</p> <p><b>5. MARGINS. 1.84(g).</b> Acceptable margins : Top 2.5cm – Left 2.5cm – Right 1.5cm – Bottom 1cm <input type="checkbox"/> Margins not acceptable. Fig(s).</p> <p style="padding-left: 40px;"><input type="checkbox"/> Top   <input type="checkbox"/> Left   <input type="checkbox"/> Right   <input type="checkbox"/> Bottom</p> <p><b>6. VIEWS. 1.84(h).</b> REMINDER: Specification may need to be revised in correspondence with the drawing changes. <input type="checkbox"/> Views not labeled separately or properly. Fig(s).</p> <p><b>7. SECTIONAL VIEWS. 1.84(h)(3).</b> <input type="checkbox"/> Sectional designation should be in Arabic or Roman number. Fig(s).</p> <p><b>8. ARRANGEMENT OF VIEWS. 1.84(i).</b> <input type="checkbox"/> Different figures must be clearly separated. Fig(s).</p>	<p><b>9. SCALE. 1.84(k).</b> <input type="checkbox"/> Scale not large enough, details not clear. Fig(s).</p> <p><b>10. CHARACTER OF LINES, NUMBERS, LETTERS. 1.84(l).</b> <input checked="" type="checkbox"/> Lines, numbers, letters not uniform, clean, and well defined, (poor quality). Fig(s). 1 - 4.</p> <p><b>11. SHADING. 1.84(m).</b> <input type="checkbox"/> Solid black shading not permitted. Fig(s).</p> <p><b>12. REFERENCE CHARACTERS: NUMBERS, LETTERS. 1.84(p).</b> <input type="checkbox"/> Characters not plain, legible. Fig(s). <input type="checkbox"/> Characters not oriented in the same direction as the view. Fig(s). <input checked="" type="checkbox"/> English required. Fig(s). 1 - 4. <input type="checkbox"/> Characters must be at least .32cm (1/8") height. Fig(s).</p> <p><b>13. LEAD LINES. 1.84(q).</b> <input type="checkbox"/> Crossed lead lines not allowed. Fig(s). <input type="checkbox"/> Missing lead lines. Fig(s).</p> <p><b>14. PAGE NUMBERING. 1.84(t).</b> <input type="checkbox"/> Drawing sheets not properly numbered. Fig(s).</p> <p><b>15. VIEW NUMBERING. 1.84(u).</b> <input type="checkbox"/> View not numbered consecutively, in Arabic numbers, begin with number 1. Fig(s).</p> <p><b>16. DESIGN DRAWINGS. 1.152.</b> <input type="checkbox"/> Surface shading not appropriate. Fig(s). <input type="checkbox"/> Solid black shading not permitted. Fig(s).</p>
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**COMMENTS:**